WEST

End of Result Set

☐ Generate Collection

L2: Entry 1 of 1 File: USPT Mar 21, 2000

US-PAT-NO: 6040157
DOCUMENT-IDENTIFIER: US 6040157 A

TITLE: Vascular endothelial growth factor 2

DATE-ISSUED: March 21, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hu; Jing-Shan	Sunnyvale	CA	N/A	N/A
Rosen; Craig A.	Laytonsville	MD	N/A	N/A
Cao; Liang	South Horizons	N/A	N/A	HKX

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Human Genome Sciences, Inc.	Rockville	MD	N/A	N/A	02

APPL-NO: 9/ 042105
DATE FILED: March 13, 1998

PARENT-CASE:
CROSS-REFERENCE TO RELATED APPLICATIONS This application is a CIP of Ser. No. 08/999,811 filed Dec. 24, 1997, now U.S. Pat. No. 5,932,540 which is a CIP of Ser. No. 08/824,996 filed Mar. 27, 1997, and a CIP of Ser. No. 08/465,968, filed Jun. 6, 1995 which is a CIP of Ser. No. 08/207,550 filed Mar. 8, 1994.

INT-CL: [7] C12N 15/18, C12N 15/63, C12N 1/21, C12N 5/00
US-CL-ISSUED: 435/69.4; 435/7.1, 435/325, 435/243, 435/320.1, 536/23.51, 530/399
US-CL-CURRENT: 435/69.4; 435/243, 435/320.1, 435/325, 435/7.1, 530/399, 536/23.51
FIELD-OF-SEARCH: 435/69.4, 435/320.1, 435/325, 435/243, 536/23.51, 530/399

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected | Search ALL

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
☐	5073492	December 1991	Chen et al.	N/A
☐	5194596	March 1993	Tischer et al.	N/A
☐	5219739	June 1993	Tischer et al.	N/A
☐	5234908	August 1993	Szabo et al.	N/A
☐	5240848	August 1993	Keck et al.	N/A
☐	5283354	February 1994	Lemischka	N/A
☐	5326695	July 1994	Andersson et al.	N/A
☐	5607918	May 1997	Eriksson et al.	N/A
☐	5633147	May 1997	Meissner et al.	N/A

FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
0476983	March 1992	EPX	
0506477	September 1992	EPX	
9403464	January 1996	ZAX	
9214748	September 1992	WOX	
9519985	July 1995	WOX	
9524414	September 1995	WOX	
9605856	February 1996	WOX	
9639515	December 1996	WOX	
9705250	February 1997	WOX	
9709427	March 1997	WOX	
9717442	May 1997	WOX	
9806844	February 1998	WOX	
9807832	February 1998	WOX	
9833917	June 1998	WOX	
9824811	June 1998	WOX	
9839035	September 1998	WOX	
9849300	November 1998	WOX	
9856936	December 1998	WOX	
9908522	February 1999	WOX	
9921590	May 1999	WOX	

OTHER PUBLICATIONS

U.S. application No. 08/340,011, filed Nov. 1994, pending.
U.S. application No. 08/510,133, filed Aug. 1995, pending.
U.S. application No. 08/585,895, filed Jan. 1996, pending.
U.S. application No. 08/601,132, filed Feb. 1996, pending.
U.S. application No. 08/671,573, filed Jun. 1996, pending.
U.S. application No. 06/003,491, filed Sep. 9, 1995, pending.
U.S. application No. 08/554,374, filed Nov. 1995, pending.
Eichmann, A., et al., Development 125(4):743-752 (1998).
Pajusola, K., et al., Cancer Research. 52:5738-5743 (1992).
Pajusola, K., et al., Oncogene 8:2931-2937 (1993).
Tischer, et al., Biochemical and Biophysical Research Communications 165(3):1198-1206 (1989).
Leung, D.W., et al., Science 246:1306-1309 (1989).

Breier, G., et al., Development 114:521-532 (1992).
Ferrara, et al., Journal of Cellular Biochemistry 47:211-218 (1991).
George et al., Macromolecular Seq. and Syn. Selected Meth--Application, pp. 127-149 (1988).
International Search Report, Application No. PCT/US99/05021.
International Search Report, Application No. PCT/US94/05291.
Achen, et al., Proc. Natl. Acad. Sci. (USA), 95(2):548-553 (1998).
Andersson et al., J. Biol. Chem., 267(16):11260-11266 (1992).
Aprelikova et al., Cancer Research, 52:746-748 (1992).
Bell et al., Nucl. Acids Res., 14(21):8427-8446 (1986).
Berse et al., Mol. Biol. Cell. 3:211-220 (1992).
Betsholtz et al., Nature 320:695-699 (1986).
Claffey et al., J. Biol. Chem. 267(23):16317-16322 (1992).
Corson et al., Genomics 17:476-484 (1993).
Dignam et al., Gene 88:133-140 (1990).
Ferrara et al., Endocrine Rev. 13(1):18-32 (1992).
Finnerty et al., Oncogene, 8(11): 2293-2298 (1993).
Heldin et al. Growth Factors 8:245-252 (1993).
Hu et al., FASEB J., 11:498-504 (1997).
Joukov et al., EMBO J. 15(2):290-298 (1996).
Joukov et al., EMBO J. 16(13):3898-3911 (1997).
Kaipainen et al., J. Exp. Med. 178:2077-2088 (1993).
Keck et al., Science 246: 1309 (1989).
Kingsley, D., Genes & Development 8:133-146 (1994).
Kukk et al., Development, 122: 3829-37 (1996).
Lee et al, Proc. Natl. Acad. Sci. (USA), 93:1988-1992 (1996).
Maglione et al., Oncogene 8:925-931 (1993).
Maglione et al., Proc. Natl. Acad. Sci. (USA), 88:9267-9271 (1991).
Massague, J. Annu. Rev. Cell Biol. 6:597-641 (1990).
Matthews et al., Proc. Natl. Acad. Sci. (USA), 88:9026-9030 (1991).
Millauer et al., Cell 72:835-846 (1993).
Millauer et al., Nature 367:576-579 (1994).
Oltvai et al., Cell, 74:609-619 (1993).
Paulsson et al., J. Mol. Biol. 211:331-349 (1990).
Tanaka et al., Mol. Cell Biol. 7(5):1978-1983 (1987).
Terman et al., Oncogene 6:1677-1683 (1991).
Terman et al., Biochem. Biophys. Res. Commun. 187(3):1579-1586 (1992).
Tischer et. al., J. Biol.Chem. 266(18):11947-11954 (1991).
Tsujimoto et al., Proc. Natl. Acad. Sci (USA), 83:5214-5218 (1986).
GenBank Accession No. X68203 (1993).
GenBank Accession No. M95200 (1992).
GenBank Accession No. M24160 (1989).
GenBank Accession No. M24276 (1989).
GenBank Accession No. M24277 (1989).
GenBank Accession No. D88689 (1993).
GenBank Accession No. L07296 (1993).
GenBank Accession No. X54936 (1991).
GenBank Accession No. S57152 (1993).
GenBank Accession No. X59397 (1991).
GenBank Accession No. X52263 (1992).
GenBank Accession No. M63971 (1991).
GenBank Accession No. M63972 (1991).
Genbank Accession No. M63973 (1991).
Genbank Accession No. M63974 (1991).
GenBank Accession No. M63975 (1991).
GenBank Accession No. M63976 (1991).
GenBank Accession No. M63977 (1991).
GenBank Accession No. M63978 (1991).
GenBank Accession No. M27281 (1990).
Genbank Accession No. X04571 (1995).
GenBank Accession No. X63556 (1997).
GenBank Accession No. L19896 (1994).
GenBank Accession No. L04947 (1995).
GenBank Accession No. M16237 (1995).
GenBank Accession No. M16243 (1995).

GenBank Accession No. M16244 (1995).
GenBank Accession No. M16245 (1995).
Genbank Accession No. K03212 (1995).
Genbank Accession No. K03213 (1995).
GenBank Accession No. K03214 (1995).
GenBank Accession No. K03215 (1995).
GenBank Accession No. K03216 (1995).
GenBank Accession No. K03217 (1995).
GenBank Accession No. K03218 (1995).
GenBank Accession No. M13994 (1994).
GenBank Accession No. M13995 (1994).
GenBank Accession No. AJ000185 (1998).
GenBank Accession No. L22474 (1993).
GenBank Accession No. L22473 (1993).

ART-UNIT: 166
PRIMARY-EXAMINER: Ulm; John
ASSISTANT-EXAMINER: Saoud; Christine
ATTY-AGENT-FIRM: Human Genome Sciences Inc.

ABSTRACT:

Disclosed are human VEGF2 polypeptides, biologically active, diagnostically or therapeuticall sefl fragments, analogs, or derivatives thereof, and DNA (RNA) enco such VEGF2 polypeptides. Also provided are procedures for producing such polypeptides by recombinant techniques and antibodies and antagonists against such polypeptides. Such polypeptides may be used therapeutically for stimulating wound healing and for vascular tissue repair. Also provided are methods of using the antibodies and antagonists to inhibit tumor angiogenesis and thus tumor growth, inflammation, diabetic retinopathy, rheumatoid arthritis, and psoriasis.

75 Claims, 48 Drawing figures

WEST

End of Result Set

☐ Generate Collection

L2: Entry 1 of 1 File: USPT Mar 21, 2000

US-PAT-NO: 6040157
DOCUMENT-IDENTIFIER: US 6040157 A

TITLE: Vascular endothelial growth factor 2

DATE-ISSUED: March 21, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hu; Jing-Shan	Sunnyvale	CA	N/A	N/A
Rosen; Craig A.	Laytonsville	MD	N/A	N/A
Cao; Liang	South Horizons	N/A	N/A	HKX

US-CL-CURRENT: 435/69.4; 435/243, 435/320.1, 435/325, 435/7.1, 530/399, 536/23.51

CLAIMS:

What is claimed is:
1. An isolated polynucleotide comprising a nucleic acid encoding amino acids +24 to +396 of SEQ ID NO:2.
2. The isolated polynucleotide of 1, wherein said nucleic acid comprises nucleotides 150 to 1268 of SEQ ID NO: 1.
3. An isolated polynucleotide complementary to the polynucleotide of claim 1.
4. The isolated polynucleotide of claim 1 further comprising a heterologous polynucleotide.
5. The isolated polynucleotide of claim 4, wherein the heterologous polynucleotide encodes a heterologous polypeptide.
6. A vector comprising the polynucleotide of claim 1.
7. A host cell comprising the polynucleotide of claim 1.
8. A host cell comprising the polynucleotide of claim 1 operably associated with a heterologous regulatory sequence.
9. A method of producing a VEGF-2 polypeptide comprising:
(a) culturing the host cell of claim 8 under conditions such that the polypeptide is expressed; and
(b) recovering said polypeptide.
10. A composition comprising the isolated polynucleotide of claim 1.
11. The isolated polynucleotide of claim 1, wherein said nucleic acid encodes amino acids +1 to +396 of SEQ ID NO:2.
12. The isolated polynucleotide of claim 11, wherein said nucleic acid comprises nucleotides 81 to 1268 of SEQ ID NO:1.
13. An isolated polynucleotide complementary to the polynucleotide of claim 11.

14. The isolated polynucleotide of claim 11 further comprising a heterologous polynucleotide.
15. The isolated polynucleotide of claim 14, wherein the heterologous polynucleotide encodes a heterologous polypeptide.
16. A vector comprising the polynucleotide of claim 11.
17. A host cell comprising the polynucleotide of claim 11.
18. A host cell comprising the polynucleotide of claim 11 operably associated

with a heterologous regulatory sequence.
19. A method of producing a VEGF-2 polypeptide comprising:
(a) culturing the host cell of claim 8 under conditions such that the polypeptide is expressed; and
(b) recovering said polypeptide.
20. A composition comprising the isolated polynucleotide of claim 11.
21. The isolated polynucleotide of claim 11, wherein said nucleic acid encodes amino acids -23 to +396 of SEQ ID NO:2.
22. The isolated polynucleotide of claim 21, wherein said nucleic acid comprises nucleotides 12 to 1268 of SEQ ID NO:1.
23. An isolated polynucleotide complementary to the polynucleotide of claim 21.

24. The isolated polynucleotide of claim 21 further comprising a heterologous polynucleotide.
25. The isolated polynucleotide of claim 24, wherein the heterologous polynucleotide encodes a heterologous polypeptide.
26. A vector comprising the polynucleotide of claim 21.
27. A host cell comprising the polynucleotide of claim 21.
28. A host cell comprising the polynucleotide of claim 21 operably associated with a heterologous regulatory sequence.
29. A method of producing a VEGF-2 polypeptide comprising:
(a) culturing the host cell of claim 28 under conditions such that the polypeptide is expressed; and
(b) recovering said polypeptide.
30. A composition comprising the isolated polynucleotide of claim 21.
31. An isolated polynucleotide comprising a nucleic acid encoding a mature portion of a protein consisting of the amino acid sequence of SEQ ID NO:2.
32. An isolated polynucleotide complementary to the polynucleotide of claim 31.

33. The isolated polynucleotide of claim 31 further comprising a heterologous polynucleotide.
34. The isolated polynucleotide of claim 33, wherein the heterologous polynucleotide encodes a heterologous polypeptide.
35. A vector comprising the polynucleotide of claim 31.
36. A host cell comprising the polynucleotide of claim 31.
37. A host cell comprising the polynucleotide of claim 31 operably associated with a heterologous regulatory sequence.
38. A method of producing a VEGF-2 polypeptide comprising:
(a) culturing the host cell of claim 37 under conditions such that the polypeptide is expressed; and
(b) recovering said polypeptide.
39. A composition comprising the isolated polynucleotide of claim 31.
40. The isolated polynucleotide of claim 31, wherein said nucleic acid encodes a proprotein portion of a protein consisting of the amino acid sequence of SEQ ID NO:2.
41. An isolated polynucleotide complementary to the polynucleotide of claim 40.

42. The isolated polynucleotide of claim 40 further comprising a heterologous polynucleotide.
43. The isolated polynucleotide of claim 42 wherein the heterologous polynucleotide encodes a heterologous polypeptide.
44. A vector comprising the polynucleotide of claim 40.
45. A host cell comprising the polynucleotide of claim 40.
46. A host cell comprising the polynucleotide of claim 40 operably associated with a heterologous regulatory sequence.
47. A method of producing a VEGF-2 polypeptide comprising:
(a) culturing the host cell of claim 46 under conditions such that the polypeptide is expressed; and
(b) recovering said polypeptide.
48. A composition comprising the isolated polynucleotide of claim 40.
49. An isolated polynucleotide comprising a nucleic acid encoding a mature portion of a protein encoded by the cDNA contained in ATCC Deposit No. 97149.
50. An isolated polynucleotide complementary to the polynucleotide of claim 49.

51. The isolated polynucleotide of claim 49 further comprising a heterologous

polynucleotide.
52. The isolated polynucleotide of claim 51, wherein the heterologous polynucleotide encodes a heterologous polypeptide.
53. A vector comprising the polynucleotide of claim 49.
54. A host cell comprising the polynucleotide of claim 49.
55. A host cell comprising the polynucleotide of claim 49 operaably associated with a heterologous regulatory sequence.
56. A method of producing a VEGF-2 polypeptide comprising:
(a) culturing the host cell of claim 55 under conditions such that the polypeptide is expressed; and
(b) recovering said polypeptide.
57. A composition comprising the isolated polynucleotide of claim 49.
58. The isolated polynucleotide of claim 49, wherein said nucleic acid encodes a proprotein portion of a protein encoded by the cDNA contained in ATCC Deposit No. 97149.
59. An isolated polynucleotide complementary to the polynucleotide of claim 58.

60. The isolated polynucleotide of claim 58 further comprising a heterologous polynucleotide.
61. The isolated polynucleotide of claim 60, wherein the heterologous polynucleotide encodes a heterologous polypeptide.
62. A vector comprising the polynucleotide of claim 58.
63. A host cell comprising the polynucleotide of claim 58.
64. A host cell comprising the polynucleotide of claim 58 operably associated with a heterologous regulatory sequence.
65. A method of producing a VEGF-2 polypeptide comprising:
(a) culturing the host cell of claim 64 under conditions such that the polypeptide is expressed; and
(b) recovering said polypeptide.
66. A composition comprising the isolated polynucleotide of claim 58.
67. The isolated polynucleotide of claim 49, wherein said nucleic acid encodes a complete amino acid sequence encoded by the cDNA contained in ATCC Deposit No. 97149.
68. An isolated polynucleotide complementary to the polynucleotide of claim 67.

69. The isolated polynucleotide of claim 67 further comprising a heterologous polynucleotide.
70. The isolated polynucleotide of claim 69, wherein the heterologous polynucleotide encodes a heterologous polypeptide.
71. A vector comprising the polynucleotide of claim 67.
72. A host cell comprising the polynucleotide of claim 67.
73. A host cell comprising the polynucleotide of claim 67 operably associated with a heterologous regulatory sequence.
74. A method of producing a VEGF-2 polypeptide comprising:
(a) culturing the host cell of claim 73 under conditions such that the polypeptide is expressed; and
(b) recovering said polypeptide.
75. A composition comprising the isolated polynucleotide of claim 67.

WEST

End of Result Set

☐ Generate Collection

L1: Entry 1 of 1 File: USPT Aug 3, 1999

US-PAT-NO: 5932540
DOCUMENT-IDENTIFIER: US 5932540 A

TITLE: Vascular endothelial growth factor 2

DATE-ISSUED: August 3, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hu; Jing-Shan	Sunnyvale	CA	N/A	N/A
Rosen; Craig A.	Laytonsville	MD	N/A	N/A
Cao; Liang	Hong Kong	N/A	N/A	HKX

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Human Genome Sciences, Inc.	Rockville	MD	N/A	N/A	02

APPL-NO: 8/ 999811
DATE FILED: December 24, 1997

PARENT-CASE:
CROSS-REFERENCE TO RELATED APPLICATIONS This application is a continuation-in-part of both U.S. application Ser. No. 08/207,550, filed Mar. 8, 1994 now abandoned, and U.S. application Ser. No. 08/465,968, filed Jun. 6, 1995. The content of all the aforesaid applications are relied upon and incorporated by reference in their entirety.

INT-CL: [6] A61K 38/14, C07K 14/475
US-CL-ISSUED: 514/2; 530/326, 530/399, 530/402
US-CL-CURRENT: 514/2; 530/326, 530/399, 530/402
FIELD-OF-SEARCH: 514/2, 514/12, 530/399, 530/326, 530/402

102(e)

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected | Search ALL

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
☐	5073492	December 1991	Chen et al.	435/240.2
☐	5219739	June 1993	Tischer et al.	435/69.4
☐	5326695	July 1994	Andersson et al.	435/70.1
☐	5607918	March 1997	Eriksoon et al.	514/12

FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
0476983	March 1992	EPX	
0506477	September 1992	EPX	
9705250	February 1997	WOX	
9709427	March 1997	WOX	
9717442	May 1997	WOX	

OTHER PUBLICATIONS

Eichmann, A., et al., Development 125(4):743-752 (1998).
Pajusola, K., et al., Cancer Research. 52:5738-5743 (1992).
Pajusola, K., et al., Oncogene 8:2931-2937 (1993).
Tischer, et al., Biochemical and Biophysical Research Communications 165(3):1198-1206 (1989).
Leung, D.W., et al., Science 246:1306-1309 (1989).
Breier, G., et al., Development 114:521-532 (1992).
Ferrara, et al., Journal of Cellular Biochemistry 47:211-218 (1991).
George et al., Macromolecular Seq. and Syn. Selected Meth--Application, pp. 127-149 (1988).

ART-UNIT: 166
PRIMARY-EXAMINER: Ulm; John
ASSISTANT-EXAMINER: Saoud; Christine
ATTY-AGENT-FIRM: Human Genome Sciences, Inc.

ABSTRACT:

Disclosed are human VEGF2 polypeptides, biologically active, diagnostically or therapeutically useful fragments, analogs, or derivatives thereof, and DNA(RNA) encoding such VEGF2 polypeptides. Also provided are procedures for producing such polypeptides by recombinant techniques and antibodies and antagonists against such polypeptides. Such polypeptides may be used therapeutically for stimulating wound healing and for vascular tissue repair. Also provided are methods of using the antibodies and antagonists to inhibit tumor angiogenesis and thus tumor growth, inflammation, diabetic retinopathy, rheumatoid arthritis, and psoriasis.

186 Claims, 22 Drawing figures

WEST

End of Result Set

☐ Generate Collection

L1: Entry 1 of 1 File: USPT Aug 3, 1999

US-PAT-NO: 5932540
DOCUMENT-IDENTIFIER: US 5932540 A

TITLE: Vascular endothelial growth factor 2

DATE-ISSUED: August 3, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hu; Jing-Shan	Sunnyvale	CA	N/A	N/A
Rosen; Craig A.	Laytonsville	MD	N/A	N/A
Cao; Liang	Hong Kong	N/A	N/A	HKX

US-CL-CURRENT: 514/2; 530/326, 530/399, 530/402

CLAIMS:

What is claimed is:
1. An isolated polypeptide comprising a mature portion of a protein consisting of the amino acid sequence of SEQ ID NO:2 or SEQ ID NO:4.
2. The isolated polypeptide of claim 1 comprising a proprotein portion of a protein consisting of the amino acid sequence of SEQ ID NO:2 or SEQ ID NO:4.
3. An isolated polypeptide comprising a mature portion of a protein encoded by the cDNA contained in ATCC Deposit Nos. 75968 or 97149.
4. The isolated polypeptide of claim 3 comprising a proprotein portion of a protein encoded by the cDNA contained in ATCC Deposit Nos. 75968 or 97149.
5. The isolated polypeptide of claim 4 comprising a protein encoded by the cDNA contained in ATCC Deposit Nos. 75968 or 97149.
6. An isolated polypeptide comprising amino acids 131 to 144 of SEQ ID NO:2.
7. The isolated polypeptide of claim 6 comprising amino acids 71 to 396 of SEQ ID NO:2.
8. The isolated polypeptide of claim 6 comprising amino acids 47 to 396 of SEQ ID NO:2.
9. The isolated polypeptide of claim 6 comprising amino acids 24 to 396 of SEQ ID NO:2.
10. The isolated polypeptide of claim 6 comprising amino acids 1 to 396 of SEQ ID NO:2.
11. The isolated polypeptide of claim 6 comprising amino acids -23 to 396 of SEQ ID NO:2.
12. An isolated polypeptide comprising a polypeptide fragment of SEQ ID NO:2 or a polypeptide fragment encoded by the cDNA contained in ATCC Deposit Nos. 75968 or 97149, wherein said fragment has angiogenic activity.
13. An isolated polypeptide comprising a polypeptide fragment of SEQ ID NO:2 or a polypeptide fragment encoded by the cDNA contained in ATCC Deposit Nos. 75968 or 97149, wherein said fragment has endothelial cell proliferative activity.
14. An isolated polypeptide comprising a polypeptide fragment of at least 30 contiguous amino acids of SEQ ID NO:2 or encoded by the cDNA contained in ATCC Deposit Nos. 75968 or 97149.
15. The isolated polypeptide of claim 14, wherein the polypeptide fragment comprises at least 50 contiguous amino acids of SEQ ID NO:2 or encoded by the

cDNA contained in ATCC Deposit Nos. 75968 or 97149.
16. A fusion protein comprising the polypeptide of claim 1 fused to a heterologous polypeptide.
17. A fusion protein comprising the polypeptide of claim 2 fused to a heterologous polypeptide.
18. A fusion protein comprising the polypeptide of claim 3 fused to a heterologous polypeptide.
19. A fusion protein comprising the polypeptide of claim 4 fused to a heterologous polypeptide.
20. A fusion protein comprising the polypeptide of claim 5 fused to a heterologous polypeptide.
21. A fusion protein comprising the polypeptide of claim 6 fused to a heterologous polypeptide.
22. A fusion protein comprising the polypeptide of claim 7 fused to a heterologous polypeptide.
23. A fusion protein comprising the polypeptide of claim 8 fused to a heterologous polypeptide.
24. A fusion protein comprising the polypeptide of claim 9 fused to a heterologous polypeptide.
25. A fusion protein comprising the polypeptide of claim 10 fused to a heterologous polypeptide.
26. A fusion protein comprising the polypeptide of claim 11 fused to a heterologous polypeptide.
27. A fusion protein comprising the polypeptide of claim 12 fused to a heterologous polypeptide.
28. A fusion protein comprising the polypeptide of claim 13 fused to a heterologous polypeptide.
29. A fusion protein comprising the polypeptide of claim 14 fused to a heterologous polypeptide.
30. A fusion protein comprising the polypeptide of claim 15 fused to a heterologous polypeptide.
31. The polypeptide of claim 1 comprising a homodimer.
32. The polypeptide of claim 2 comprising a homodimer.
33. The polypeptide of claim 3 comprising a homodimer.
34. The polypeptide of claim 4 comprising a homodimer.
35. The polypeptide of claim 5 comprising a homodimer.
36. The polypeptide of claim 6 comprising a homodimer.
37. The polypeptide of claim 7 comprising a homodimer.
38. The polypeptide of claim 8 comprising a homodimer.
39. The polypeptide of claim 9 comprising a homodimer.
40. The polypeptide of claim 10 comprising a homodimer.
41. The polypeptide of claim 11 comprising a homodimer.
42. The polypeptide of claim 12 comprising a homodimer.
43. The polypeptide of claim 13 comprising a homodimer.
44. The polypeptide of claim 14 comprising a homodimer.
45. The polypeptide of claim 15 comprising a homodimer.
46. The polypeptide of claim 1 which is glycosylated.
47. The polypeptide of claim 2 which is glycosylated.
48. The polypeptide of claim 3 which is glycosylated.
49. The polypeptide of claim 4 which is glycosylated.
50. The polypeptide of claim 5 which is glycosylated.
51. The polypeptide of claim 6 which is glycosylated.
52. The polypeptide of claim 7 which is glycosylated.
53. The polypeptide of claim 8 which is glycosylated.
54. The polypeptide of claim 9 which is glycosylated.
55. The polypeptide of claim 10 which is glycosylated.
56. The polypeptide of claim 11 which is glycosylated.
57. The polypeptide of claim 12 which is glycosylated.
58. The polypeptide of claim 13 which is glycosylated.
59. The polypeptide of claim 14 which is glycosylated.
60. The polypeptide of claim 15 which is glycosylated.
61. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 1, wherein the patient has a wound.
62. The method of claim 61, wherein the method stimulates angiogenesis.

63. The method of claim 61, wherein the patient is a human.
64. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 1, wherein the patient has tissue damage.
65. The method of claim 64, wherein the method stimulates angiogenesis.
66. The method of claim 64, wherein the patient is a human.
67. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 1, wherein the patient has bone damage.
68. The method of claim 67, wherein the method stimulates angiogenesis.
69. The method of claim 67, wherein the patient is a human.
70. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 2, wherein the patient has a wound.
71. The method of claim 70, wherein the method stimulates angiogenesis.
72. The method of claim 70, wherein the patient is a human.
73. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 2, wherein the patient has tissue damage.
74. The method of claim 73, wherein the method stimulates angiogenesis.
75. The method of claim 73, wherein the patient is a human.
76. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 2, wherein the patient has bone damage.
77. The method of claim 76, wherein the method stimulates angiogenesis.
78. The method of claim 76, wherein the patient is a human.
79. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 3, wherein the patient has a wound.
80. The method of claim 79, wherein the method stimulates angiogenesis.
81. The method of claim 79, wherein the patient is a human.
82. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 3, wherein the patient has tissue damage.
83. The method of claim 82, wherein the method stimulates angiogenesis.
84. The method of claim 82, wherein the patient is a human.
85. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 3, wherein the patient has bone damage.
86. The method of claim 85, wherein the method stimulates angiogenesis.
87. The method of claim 85, wherein the patient is a human.
88. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 4, wherein the patient has a wound.
89. The method of claim 88, wherein the method stimulates angiogenesis.
90. The method of claim 88, wherein the patient is a human.
91. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 4, wherein the patient has tissue damage.
92. The method of claim 91, wherein the method stimulates angiogenesis.
93. The method of claim 91, wherein the patient is a human.
94. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 4, wherein the patient has bone damage.
95. The method of claim 94, wherein the method stimulates angiogenesis.
96. The method of claim 94, wherein the patient is a human.
97. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 5, wherein the patient has a wound.
98. The method of claim 97, wherein the method stimulates angiogenesis.
99. The method of claim 97, wherein the patient is a human.
100. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 5, wherein the patient has tissue damage.
101. The method of claim 100, wherein the method stimulates angiogenesis.

102. The method of claim 100, wherein the patient is a human.
103. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 5, wherein the patient has bone damage.
104. The method of claim 103, wherein the method stimulates angiogenesis.
105. The method of claim 103, wherein the patient is a human.
106. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 7, wherein the patient has a wound.
107. The method of claim 106, wherein the method stimulates angiogenesis.
108. The method of claim 106, wherein the patient is a human.
109. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 7, wherein the patient has tissue damage.
110. The method of claim 109, wherein the method stimulates angiogenesis.
111. The method of claim 109, wherein the patient is a human.
112. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 7, wherein the patient has bone damage.
113. The method of claim 112, wherein the method stimulates angiogenesis.
114. The method of claim 112, wherein the patient is a human.
115. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 8, wherein the patient has a wound.
116. The method of claim 115, wherein the method stimulates angiogenesis.
117. The method of claim 115, wherein the patient is a human.
118. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 8, wherein the patient has tissue damage.
119. The method of claim 118, wherein the method stimulates angiogenesis.
120. The method of claim 118, wherein the patient is a human.
121. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 8, wherein the patient has bone damage.
122. The method of claim 121, wherein the method stimulates angiogenesis.
123. The method of claim 121, wherein the patient is a human.
124. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 9, wherein the patient has a wound.
125. The method of claim 124, wherein the method stimulates angiogenesis.
126. The method of claim 124, wherein the patient is a human.
127. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 9, wherein the patient has tissue damage.
128. The method of claim 127, wherein the method stimulates angiogenesis.
129. The method of claim 127, wherein the patient is a human.
130. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 9, wherein the patient has bone damage.
131. The method of claim 130, wherein the method stimulates angiogenesis.
132. The method of claim 130, wherein the patient is a human.
133. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 10, wherein the patient has a wound.
134. The method of claim 133, wherein the method stimulates angiogenesis.
135. The method of claim 133, wherein the patient is a human.
136. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 10, wherein the patient has tissue damage.
137. The method of claim 136, wherein the method stimulates angiogenesis.
138. The method of claim 136, wherein the patient is a human.
139. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 10, wherein the patient has bone damage.
140. The method of claim 139, wherein the method stimulates angiogenesis.

141. The method of claim 139, wherein the patient is a human.
142. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 11, wherein the patient has a wound.
143. The method of claim 142, wherein the method stimulates angiogenesis.
144. The method of claim 142, wherein the patient is a human.
145. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 11, wherein the patient has tissue damage.
146. The method of claim 145, wherein the method stimulates angiogenesis.
147. The method of claim 145, wherein the patient is a human.
148. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 11, wherein the patient has bone damage.
149. The method of claim 148, wherein the method stimulates angiogenesis.
150. The method of claim 148, wherein the patient is a human.
151. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 12, wherein the patient has a wound.
152. The method of claim 151, wherein the method stimulates angiogenesis.
153. The method of claim 151, wherein the patient is a human.
154. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 12, wherein the patient has tissue damage.
155. The method of claim 154, wherein the method stimulates angiogenesis.
156. The method of claim 154, wherein the patient is a human.
157. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 12, wherein the patient has bone damage.
158. The method of claim 157, wherein the method stimulates angiogenesis.
159. The method of claim 157, wherein the patient is a human.
160. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 13, wherein the patient has a wound.
161. The method of claim 160, wherein the method stimulates angiogenesis.
162. The method of claim 160, wherein the patient is a human.
163. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 13, wherein the patient has tissue damage.
164. The method of claim 163, wherein the method stimulates angiogenesis.
165. The method of claim 163, wherein the patient is a human.
166. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 13, wherein the patient has bone damage.
167. The method of claim 166, wherein the method stimulates angiogenesis.
168. The method of claim 166, wherein the patient is a human.
169. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 14, wherein the patient has a wound.
170. The method of claim 169, wherein the method stimulates angiogenesis.
171. The method of claim 169, wherein the patient is a human.
172. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 14, wherein the patient has tissue damage.
173. The method of claim 172, wherein the method stimulates angiogenesis.
174. The method of claim 172, wherein the patient is a human.
175. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 14, wherein the patient has bone damage.
176. The method of claim 175, wherein the method stimulates angiogenesis.
177. The method of claim 175, wherein the patient is a human.
178. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 15, wherein the patient has a wound.
179. The method of claim 178, wherein the method stimulates angiogenesis.

180. The method of claim 178, wherein the patient is a human.
181. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 15, wherein the patient has tissue damage.
182. The method of claim 181, wherein the method stimulates angiogenesis.
183. The method of claim 181, wherein the patient is a human.
184. A method of stimulating proliferation of endothelial cells in a patient comprising administering to the patient the polypeptide of claim 15, wherein the patient has bone damage.
185. The method of claim 184, wherein the method stimulates angiogenesis.
186. The method of claim 184, wherein the patient is a human.